First Response

Remarks

Claims 1, 5, 8 and 17 have been amended, claims 6, 7, 9-15 and 20 are either cancelled or withdrawn because of the election, and claims 21-28 have been added. Accordingly claims 1-5, 8, 16-19 and 21-28 remain for the Examiner's further consideration.

Claim 1 was rejected as unpatentable over Rasmussen in view of Kelley. Reconsideration of claim 1 as amended is most respectfully requested. Claim 1 calls for a heat exchanger comprising a housing including a cylindrical shell closed by a top cover member and a bottom cover member, with a plurality of first and second heat transfer plates located within the shell with the first and second heat transfer plates interleaved in alternating relationship in a plate stack. The plates are formed with channels on opposite sides to provide first and second fluid passages, with the first fluid passages for a first fluid in alternate spaces and second fluid passages for a second fluid in remaining spaces. A resilient member is located in the housing adjacent one end of the plate stack, supporting the plate stack and compensating for any expansion or contraction of the heat transfer plates along the longitudinal axis of the housing. Nothing similar to this construction is shown in the references.

The Examiner states that the Rasmussen patent discloses all of the claimed features with the exception of the expansion element being a corrugated member (now referred to as a resilient member) and that Kelley discloses such a member. However, applicant submits that Kelley does not suggest adding an expansion member in Rasmussen and in fact does not even disclose an expansion member. Kelley is from a completely non-analogous art which has nothing to do with plate-type heat exchangers. Kelley's strips 16 serve as heat dissipaters. The corrugations in the strips are crushed when the heat generating device 12 is bolted to the support platform 14. The strips do not provide a spring cushion for the heat generating device 12, but serve merely to dissipate heat. Kelley does not suggest anything similar to Tranter's disk 50 which acts as an expansion / contraction member that supports one end of a plate stack in a heat exchanger. Under the circumstances, and in view of the amendments of claim 1, it is believed that claim 1 is entitled to allowance.

Claim 2 depends from claim 1 and is believed to be allowable along with claim 1, stating that the heat transfer plates are formed with an inlet port and an outlet port for fluid connection with the first fluid passages.

Claim 3 is dependent upon claim 2 and is believed to be allowable along with claim 2 and further because of the recitation of the shell being formed with a first inlet nozzle for feeding the second fluid to the second fluid passages and also being formed with a first outlet nozzle diametrically opposed to the first inlet nozzle for permitting the second fluid to exit the heat exchanger. In Rasmussen, the inlet and outlet nozzles are formed in an end of the heat exchanger, not in the cylindrical shell.

Claim 4 is dependent upon claim 3 and is believed to be allowable along with claim 3 and further because it recites that the periphery of the heat transfer plates is uniformly spaced from the inner surface of the cylindrical shell to provide a chamber that is divided by a pair of diametrically opposed seals within the chamber into an arcuate inlet chamber connected to the first inlet nozzle and an arcuate outlet chamber connected to the first outlet nozzle. The concept of admitting fluid into an arcuate chamber between the periphery of the plates and the inner surface of the shell connected to the first nozzle and providing an outlet chamber also between the periphery of the plates and the inner surface of the shell which is connected to the first outlet nozzle is completely foreign to anything in Rasmussen. In Rasmussen, the periphery of the plates is sealed against the inner surface of the shell by seals 92. Referring to Figure 9 of Rasmussen, high pressure in the spaces between the plates is applied to the inner spacer pieces 94 which transmit the pressure to the main seals 92. The main seals 92 in turn transmit pressure to the outer spacer pieces 96 which abut the high pressure enclosure 64. In this connection, reference is made to Figure 9 and column 5, lines 43-52 of Rasmussen. Accordingly, claim 4 is believed to clearly and patentably distinguish over the references.

Claim 5 depends from claim 4 and is believed to be allowable along with claim 4.

Claim 8 depends from claim 5 and further defines the resilient member at one end of the stack of heat transfer plates as including a disk formed with circular corrugations, thus further distinguishing over the prior art.

Claim 17 was indicated as allowable if rewritten in independent form. Claim 17 has now been amended to include all of the limitations of the claims from which it depended and therefore claim 17 is believed to be allowable. The wording has been altered slightly in lines 5 and 6 to change "stacked relationship"-- relationship in a plate stack -- and in line 12 to insert -- or contraction -- after "expansion".

Claims 18 and 19 were also indicated as allowable and depend from claim 17.

New claim 21 is written along the lines of claim 1, but without any reference to the resilient member referred to in claim 1. Claim 1 states that the periphery of the first and second heat transfer plates are spaced from the inner surface of the cylindrical shell to provide an inlet chamber and an outlet chamber. The shell of the heat exchanger has a shell inlet for feeding the second fluid into the inlet chamber and from the inlet chamber into the second fluid passages, and a shell outlet for permitting the second fluid to pass through the second chamber and exit the heat exchanger from the shell outlet. The provision of inlet and outlet chambers in a space between the periphery of the plates and the inner surface of the shell, with the inlet chamber connected to the shell inlet and the outlet chamber connected to the shell outlet has been discussed previously in connection with claims 3 and 4. Nothing similar to this is shown in Rasmussen. As previously pointed out, Rasmussen seals the peripheries of the plates to the inner surface of the shell rather than providing inlet and outlet chambers for fluid between the plate peripheries and the shell. Accordingly claim 21 is believed to be allowable.

Claim 22 depends from claim 21 and distinguishes further from the prior art by adding a circular area surrounding said plates, that is divided by seals within the area to provide the inlet and outlet chambers.

Claim 23 depends from claim 22 and is believed to be allowable along with claim 22, stating that the heat transfer plates are formed with inlet ports and outlet ports in the body thereof, connected to housing inlets and outlets.

Claim 24 depends from claim 23 and states that the first heat transfer plates and the second heat transfer plates form a series of cassettes stacked on top of each other. Although Rasmussen discloses a stack set of plates, Rasmussen does not form the plates into a series of cassettes.

Claim 25 depends from claim 24 and states that the cassettes each comprise a first heat transfer plate and identical second heat transfer plate which has been rotated 180 degrees and turned over and superimposed upon the first heat transfer plate. Again this arrangement of plates in a cassette is not shown or described in Rasmussen.

Claim 26 depends from claim 25 and is believed to be allowable along with claim 25.

Claim 27 is dependent upon claim 26 and is believed to be allowable along with claim 26.

Claim 28 is dependent upon claim 27 and further includes the resilient member at one end of the plate stack for supporting the plate stack and compensating for any expansion or contraction thereof along the longitudinal axis of the housing. As pointed out previously in connection with claim 1, there is nothing in either Rasmussen or Kelley to suggest the use of a resilient member for supporting one end of a stack of heat transfer plates in a heat exchanger.

In view of the foregoing, this application is now believed to be in condition for allowance and such action is respectfully requested.

The Commissioner is hereby authorized to charge any deficiencies, or credit any overpayments associated with this communication to our Deposit Account No. 50-0852.

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450, on May 25, 2004.

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Respectfully submitted,

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